Notice of Allowability	Application No.	Applicant(s)	
	10/646,875	YANG ET AL.	
	Examiner	Art Unit	
	Igor Kershteyn	3745	

-- The MAILING DATE of this communication appears on the c ver sheet with the correspondenc address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☐ This communication is responsive to _____.

2. ☒ The allowed claim(s) is/are *1-20*.

3. ☒ The drawings filed on *22 August 2003* are accepted by the Examiner.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date 08/22/2003
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Erik C. Swanson (Reg. No. 40,194) on January 5, 2005.

The application has been amended as follows:

IN THE CLAIMS:

In claim 20, line 10, "the outer cooling cavity" has been changed to –said combustor shell--.

The above change has been made to overcome rejections under 35 USC 112, second paragraph.

Reasons for allowance

The following is an examiner's statement of reasons for allowance:

The instant invention is deemed to be directed to an unobvious improvement to a turbine vane over U.S. Patent No. 4,153,386 which teaches a turbine vane 12 comprising a generally elongated hollow vane 20 formed from an outer wall 38,44, the vane having a leading edge 30, a trailing edge 34, a first end, a second end opposite

the first end for sealing the turbine vane to a rotatable disc, and at least one cavity 26 forming a cooling system in the vane; at least one impingement insert 78 in the at least one cavity 26 forming an inner cooling cavity and an outer cooling cavity, whereby the at least one impingement insert 78 includes at least one impingement orifice 86 providing a gas pathway between the inner cooling cavity and the outer cooling cavity.

Regarding claims 1 and 7, the improvement comprises at least one first pressure sensor for measuring pressure in the inner cooling cavity, and at least one second pressure sensor for measuring pressure between the impingement insert and the outer wall of the turbine vane.

Regarding claim 13, the improvement comprises a method of determining the presence of plugged impingement orifices in an airfoil, comprising: measuring a first pressure in an inner cooling cavity of an airfoil formed by an impingement insert proximate to an outer wall of the airfoil to determine a first pressure measurement, measuring a second pressure in an outer cooling cavity between the impingement insert and the outer wall of the airfoil to determine a second pressure measurement, determining a differential pressure between the inner cooling cavity and the outer cooling cavity by comparing the first pressure measurement taken in the inner cooling cavity with the second pressure measurement taken in the outer cooling cavity; and comparing the differential pressure with known benchmark differential pressures to determine whether impingement orifices in the impingement insert are plugged.

Regarding claim 20, the improvement comprises a method of determining burn off of a showerhead of an airfoil usable in a turbine engine, comprising: measuring a

first pressure in an inner forward cooling cavity of an airfoil proximate to a leading edge of the airfoil to determine a first pressure measurement, measuring a second pressure in a combustor shell of the turbine engine to determine a second pressure measurement; determining a differential pressure between the inner cooling cavity and a pressure outside the airfoil at the showerhead by comparing the first pressure measurement taken in the inner cooling cavity with the second pressure measurement taken in said combustor shell, and comparing the differential pressure with known benchmark differential pressures to determine whether loss of the showerhead has occurred.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Prior Art

Prior art made of record but not relied upon is considered pertinent to Applicant's disclosure and consist of one patent.

Bird et al. (5,193,975) is cited to show a turbine vane having an airfoil portion formed from an outer wall with a leading edge, a trailing edge and a cavity, an impingement insert but fails to show pressure sensors.

Contact information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Kershteyn whose telephone number is **(571) 272-4817**. The examiner can be reached on Monday-Friday from 8:00 a.m. to 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Look, can be reached on **(571) 272-4820**. The fax number is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308 0861.

IK
January 6, 2005

Igor Kershteyn
Patent examiner.
Art Unit 3745

EDWARD K. LOOK
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3700
1/10/05